

INTEGRATING PROJECT MANAGEMENT TOOLS FOR AUGMENTING THE PROFESSION OF CIVIL ENGINEERS IN M/S URC CONSTRUCTION (P) LTD., INDIA

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ABSTRACT

The second largest profession that contributes enormous infrastructural development in India is the construction field. It makes a substantial contribution to the national economy and provides a platform for increasing the opportunity of employment to large number of people. The construction industry has contributed an estimated share of 8% to the national GDP in 2011-12. A project encompasses a serialized set of composite activities that develops the interface between the planning and execution. As the development progresses, the entrant of new technologies and deployment of project management strategies were identified. This brings out the drastic advancement for taking up mega scale projects over many challenges that are booming up during the on-site execution of major works.

However the project completion is mostly triggered by effective monitoring in all the phases of project starting from Initiation, Planning, Execution, Review and Monitoring and Closure. Since the project is getting influenced based on the scope and complexity, the best way of handling the projects is by adopting suitable Project management tools in construction projects that focuses mainly on monitoring the timeline, cost and productivity.

In the modernized century, impregnation of new techniques and technologies into the field of construction will speed up the progress and tracking simultaneously. Some of the methods that were being majorly used by URC Construction (p) Ltd for the sake of extracting project excellence were targeted in this paper that finally results in creating the values in all the work activities.

KEYWORDS: Challenges, Project Management Tools, New Techniques and Technologies, Progress and Tracking

INTRODUCTION

Project management concept was developed in late 19th centuries for several fields of application including civil construction, heavy defense activities and other disciplines of engineering. This concept was based on Frederick Winslow Taylor's theories of scientific management, whose works were the backbone for incorporating modern project management tools that includes work breakdown structure (WBS), resource allocation and earned value theorem.

The year 1950s were marked as the beginning of modern project management era where core engineering fields came together to work as one. During that period of time, two mathematical project-scheduling models called Critical Path Method (CPM), developed mainly for managing plant maintenance projects and Program Evaluation and Review Technique (PERT) that quickly spreads into many private enterprises. Henry Gantt, the father of planning and control techniques, is famous for using Gantt chart as a project management tool and Henri Fayol who created the foundation for basic concepts for projects and program management that depicts the concept of five management functions.

Project management is marked to be the recognized and distinct discipline among the management areas which envelopes the engineering model.

Recently, the development in planning process are seems to be in hike, where the adoption of latest techniques and methodologies with the assistance of software were progressed. The majorly provoking project management tools are BIM, Last Planner System, etc.

PROJECT MANAGEMENT TOOLS AND TECHNIQUES USED IN URCC.

“Planning the process plans for the success”.

If the plan dwindles at any of its stages during the project cycle, it will break down the complete work flow processes. The project is a momentary process which is created mainly for satisfying the timely requirements. The major constraints that were recognized more in M/s URC constructions (p) Ltd are time and fund related issues. On prompt completion and timely payments in projects requires the Project management tool that will guide to cater the work process based on its needs and site adoptability. Thus the major constraints were minimized visually from implementing project management tools by proper allocation of essential inputs to meet out the prior defined goals. A brief summary on the project management tools used in M/s URC Construction (P) Ltd., India described below.

Project Management Tools and Techniques for Monitoring Time Line

- Bar Chart

Project Management Tools and Techniques for Monitoring Timeline with Resources

- Microsoft Project.

Project Management Tools and Techniques for Monitoring Timeline with Resources & Cost

- CIMS - ERP
- Building Information Modeling.

Project Management Tools and Techniques for Monitoring Time Line

BAR CHARTS

The most popular graphs used during the end of 20th century were Bar charts. They can be plotted either vertically or horizontally in a manner that required for comparisons of data. They are very user-friendly and widely used because of its simplicity in interpreting the results.

It is mainly used to represent the timeline of individual tasks. The project tasks will be divided into Work Breakdown Structure (WBS) based on the nature of work and timeline will be assigned to the respective task. In this chart, the tasks and its duration will be highlighted and it helps in plotting the individual work activities with respect to their time frame. The representation shows that the horizontal axis labels are long, where the descriptions about the work were made and the values that are shown in vertical axis represents the duration.

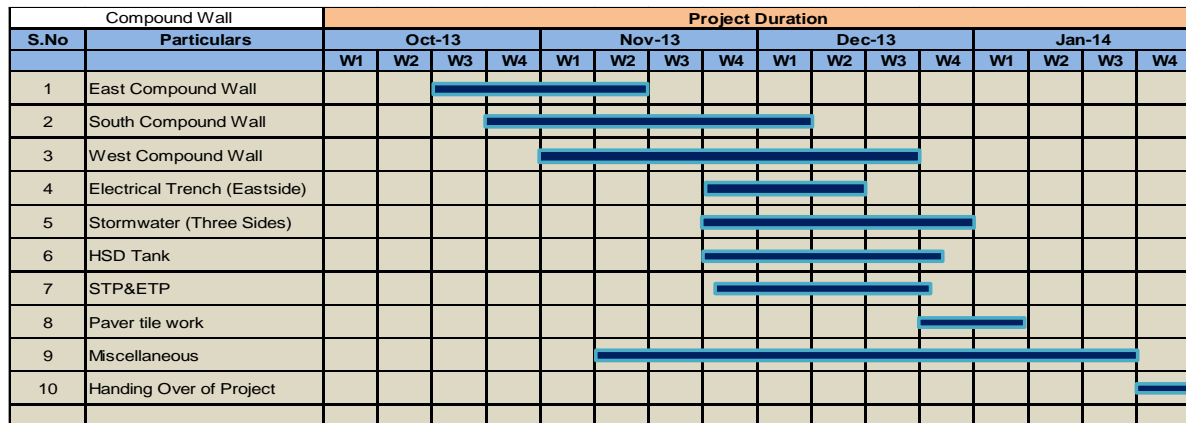


Figure 1: Sample Bar Chart

Applications in URCC for Bar Chart

In URC Constructions, the concept of bar chart for the purpose of highlighting the tasks was used in smaller projects. It depends mainly on the value and timeline of the project. If the value is less than 1Crore and the time line is less than 6 months, the adoption of Bar chart will be taken up. The updating of values will be made for every week to understand the progress. Based on the prior week performance rate, the project chart will be updated accordingly.

Benefits of Using Bar chart

The first and foremost advantage is to help the reviewer for understanding the different activities that are involved in the project, for knowing the time period that the activity has been scheduled to be last in the total duration of the project, for identifying the lapping of different activities and finally for having a grip over the start and finish date of the project. The other supports that we can yield by creating the Bar chart are to modify the planned work details using simple tools.

Suggestions/Recommendations after Using Bar Chart

It is suitable for small scale projects that are having lesser time duration for completing the activities. The tracking and accuracy will be more if the lesser timeline period of work is seen.

Frequently, the Bar chart is illusive in its apparent simplicity. Since human error may originate due to the diagrammatic representation of works. In such cases, the use of software like MSP can be used. They are widely used for finding out the temporal problems that have been protruding during the construction. They are used for identifying critical activities and decision to start up with non-critical activities that were tedious when N numbers of activities are progressing. This process gives methodical approach to execute the list of activities without any hindrances by identifying the issues earlier. Thus the earlier methods of Project management tools have influenced the better process of planning in the execution of different activities. Further elevating of planning process can be achieved with the help of updated version of software like Microsoft Project, Autodesk Revit, etc.

MICROSOFT PROJECT

In the historic construction period, we could see vividly know that there was no planning process. Only the head of the project will execute the sequence of work by his experience with hands. Recent developments in technologies brought out the impregnation of Microsoft project in accomplishing the sequential process flow by identifying the time period for execution, requirements of different resources and cost occurrence made during execution. This program

eliminates a mountain of grunt work and helps preventing the carpal tunnel syndrome. Thus results in executing ergonomics during the planning process of construction. This comforts in saving the stamina for doing the manual calculations that can be exceedingly used during the monitoring process of construction.

Automatically, the working hours required by each person to complete the process on time can be manipulated from the software as its outcome. The program even helps to develop better project plans, because revising the schedule quickly snaps out other strategies until the solution is identified when tasks are running late or over budget. Views and reports help in spotting out the problems anteriorly before facing it during practical performance of the tasks, like assigning too many tasks to the same beleaguered team member.

Applications in URCC

MSP is used as a planning tool to develop the timeline chart for all medium and large scale projects. The first level of process involves in creating the Master Construction Programme(MCP) that is level one schedule (L1) where the description about the entire progress of project from starting till the end will be clearly specified. This schedule will act as the baseline program for the entire span of the project. Based on L1 Schedule, the gradual segregation and development of Quarter-wise schedule, Month-wise schedule and Fortnight schedules will be prepared accordingly when the requirement arises.

The entire schedule will be updated to trace the timeline. Fortnight/Monthly MSP will be used to trace the comparison of timeline between the baselines and updated (actual) duration. The planning team works out with the catch-up schedule for matching up the delayed progress if any protrudes during the execution. In URCC, the full-fledged uses of MSP were utilized only to monitor the timeline processes but the scheme of details regarding the resource management area is still under process of implementation to review its fruitfulness in the outcome. The applications of MSP for major sites were made successful with the support of planning team who has been acting as central pool for describing the master schedule. They will be taking in-charge from Head Office for the entire operations and site team will be coordinating them for updating the current progresses.

Benefits of Using MSP

The process acts as a central timeline monitoring. It helps in identifying the bottlenecks subsequently based on the lag in timeline. The overview preparation about the work process can be clearly viewed earlier where the logical end points like milestones are tracked simultaneously. The periodical observation of each activities that is being carried out on the site will help the project team to understand thorough idea about the progress and area of improvement that are to be concentrated. The expected completion with the delay in work process can be identified earlier that helps to apply for the extension of time from the client for preceding the work without any hampering. This process of simultaneous tracking helps in project crashing; where in the total duration of the critical activities can be reduced to the possible limitable time period. Sometimes, the reduction of time period that causes increased cost due to the incorporation of excessive resources like manpower, materials, power usages, etc. can be identified. From the inference, careful study can be made to balance the time period by equally adjusting the parallel ongoing activities without increasing the cost more by means of increased input of resources. Thus with the help of software applications, the optimized work process can be planned for critical activities.

A project typically requires a lot of documents besides the project schedule. For example, a project plan may include financial-analysis spreadsheets, requirements and specifications documents, change request databases, and diagrams to show how the change-management process works. In addition, N numbers of email messages, memos, and other correspondence could change hands before a project finishes. In such cases, this software plays its various roles for minimizing the hand works by automatic generation of different reports to satisfy the requirement of details.

Suggestions after Using MSP

The resource leveling and cost monitoring process has to be improved effectively in URCC. The incorporation of this software can be made even for small scale projects. The planning team has to be equipped and trained thoroughly for effective use of this software to the higher extents.

Project Management Tools and Techniques for Monitoring Timeline with Resources & Cost

CIMS – ERP

(A Comprehensive ERP System/Solution for Construction Industry from URC InfoTech)

From Initiation to the Completion, URCIMS handles all the way of managing the projects responding to that of cost. CIMS is a comprehensive, integrated and integrative, modularized, customizable, and user-friendly Construction Information Management System, ideal for organizations engaged in construction projects and businesses. Owing to its highly customizable features, CIMS can be configured suitably and implemented quickly, thus reducing the cost of owning/using it, and also the time to gain the benefits in terms of productivity and profitability.

Its modularity allows flexible phased adoption according to client's willingness and ability to invest and preparedness to adopt. Designed for multi-location multi-user enterprise-wide usage, with Internet and/or dedicated secured communication links, and supported by powerful database, CIMS is ideal for organizations with multi-site multi-unit structures. Typical implementations facilitate corporate head office links with all site offices, giving on-line control and management capabilities over resources. This leads to overall improvement in monitoring and executing of construction work across all sites synergistically.

CIMS has currently 12 modules. All these modules are/ can be integrated with others, Finance & Accounts being the core,

Business Development, Project Planning, Project Execution, Equipment related, Human Resource, Fixed Assets, Procurement, Inventory, Maintenance, Safety, Finance & Accounts and Quality Assurance & Control

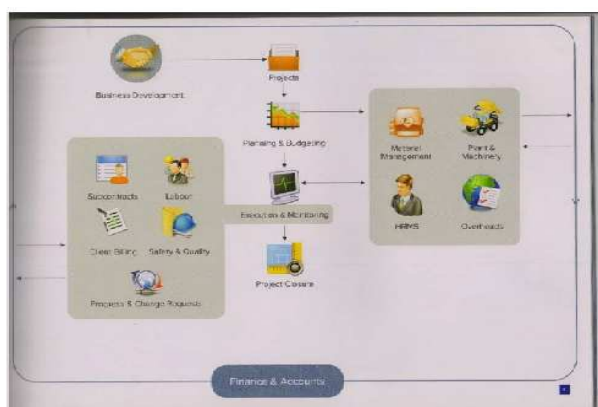


Figure 2: Process of URCCIMS



Figure 3: Reports

REPORTS

URCCIMS can produce number of reports in all the stages of Construction for conducting reviews and monitoring the project very effectively.

BUILDING INFORMATION MODELING

Building Information Modeling (BIM) is an ultimate tool in the field of construction. It provides a platform in the process of picturing that helps in visualizing the work by creating 3D process providing light effects and walkthrough for getting the real effect of imagining process; quantity take offs and details about the properties of building components and system, cost engineering and budgeting, project management, simulated products, post process of construction facility management and other purposes. The data derived from BIM can be further used to elucidate the entire life-cycle of a building from the foundation till the end of process. This helps in identifying the clashes that are blooming out during execution. Thus prior mitigation of clashes results in cost optimization.

Applications in URCC

Among the distinct dimensions, the first process of Visualization by usage of Autodesk Revit has been taken up and processed for a single project as an example. This provides the 3D renderings about the project. The quantity take-offs are automatically extracted. The further process of creating shop drawings for minimizing wastages and clashes during execution will be developed. Since the use of BIM is in the initial process of implementation, the further rewarding outcomes are being expected from the modernized software tools.

Benefits of Using BIM Tool

The benefits are yet to be identified once the full-fledged incorporation of BIM tools is made. They are less time consuming for deriving quantities as it automatically depicts the values for each process.

SUGGESTIONS

It is suggested to involve more number of personnel and to train them for using the highly informative tool. Since the outturn expected from the usage of BIM tools has its higher edge savings in time as well as cost. It has yet to get popularize among the execution field. This makes the organization to be stronger and even more competitive among the technically developed teams.

CONCLUSIONS

The use of different tools and techniques of Project Management thus creating an excellence in achieving the target on time and orienting people to be more technically sound and sophisticated in giving out their ideas. The focus towards the constraints like scope, cost and time helps out in yielding the quality product. This helps in maintaining the values and ethics of the organization.

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